# MAT1100_202338_Staging_EMBR_TEM

## MAT-1100

2023 05/01/2023 to 04/30/2024 Modified 03/22/2023

## Course Description

This year-long course builds on the material covered in Algebra 1 with more detail and added subject matter. It develops advanced algebra skills such as solving systems of equations, advanced polynomials, imaginary and complex numbers, and quadratics. Students will develop skills related to these as well as linear systems in two and three dimensions, matrices, rational expressions, and conic sections (their properties and equations). Students will expand their knowledge of functions, including exponential, radical, and logarithmic varieties. Students will have access to engaging multimedia video lectures, notes pages for each lesson summarizing the video content, practice problems, and assessments. All video lessons include a transcript and closed captioning in English and Spanish.

## Rationale

In order to be successful in the present culture, one needs basic and complex mathematical skills when performing tasks that demand precision in calculations and problem solving. Algebra II explores applications and principles of mathematics and gives the students opportunities to practice using mathematic skills and formulas that are useful in the real world. By helping students to be prepared to work in a variety of occupations, Algebra II is invaluable to individuals in fields such as engineering, business, medicine, science, and other occupations.

## Course Learning Outcomes

A. The student will perform calculations and solve problems related to sets, real numbers, square roots, exponents, scientific notation and simplifying algebraic expressions.

B. The student will investigate functions and relations, including function notation, transformations, and parent functions.

C. The student will analyze and solve linear equations for possible roots through graphing and factoring.

D. The student will use graphs and algebraic methods to solve linear equations including curve fitting, linear inequalities, equations in three dimensions and with three variables.

E. The student will explore matrices and perform operations including multiplying, finding determinants, and solve systems of equations.

F. The student will investigate quadratic expressions and equations, solve for real and imaginary roots, and perform operations using real and complex numbers.

G. The student will investigate polynomials and solve by adding, multiplying, factoring and dividing polynomials and explore polynomial functions, models, and graphs.

H. The student will explore properties of exponential and logarithmic functions, work with variations, transformations of these functions and graph results.

I. The student will solve rational and radical expressions and equations including inequalities, investigate functional relationships and identify equations of conic section.

J. The student will investigate probability and statistics and solve a variety of problems involving measures of central tendencies, probabilities and arithmetic sequences.

K. The student will explore geometric sequences and series including mathematical induction and infinite geometric series.

# Course Resources

See Ember's Systems Requirements for computer specifications necessary to operate this curriculum.

- Note: Embedded YouTube videos may be utilized to supplement Ember's YouTube videos are the property of the respective content creator, licensed to YouTube for distribution and user access. As a non-profit educational institution, Ember is able to use YouTube video content under the YouTube Terms of Service. For additional information on copyright, please contact the Jerry Falwell Library

# Course Policies

## Types of Assessments

To simplify and clearly identify which policies apply to which assessment, each assessment has been categorized into one of four categories: Lesson, Assignment, Quiz, or Test. Each applicable item on the course Modules page has been designated with an identifier chosen from among these categories. Thus, a Quiz on the American Revolution may be designated by the title, "1.2.W *Quiz*: The American Revolution."

- **Lesson:** *Any item on the Modules page designated as a "Lesson"*

These include instructional content and sometimes an assessment of that content. Typically, a Lesson will be the day-to-day work that a student completes.

- **Assignment:** *Any item on the Modules page designated as an "Assignment"*

Typical examples of Assignments include, but are not limited to, papers, book reports, projects, labs, and speeches. Assignments are usually something that the student should do his or her best work on the first time.

- **Quiz:** *Any item on the Modules page designated as a "Quiz"*

This usually takes the form of a traditional assessment where the student will answer questions to demonstrate knowledge of the subject. Quizzes cover a smaller amount of material than Tests.

- **Test:** *Any item on the Modules page designated as a "Test"*

This usually takes the form of a traditional assessment where the student will answer questions to demonstrate knowledge of the subject. Tests cover a larger amount of material than Quizzes.

## Materials Selection Policy

Ember curates educational materials that are consistent with the school's philosophy; however, the fallen human condition depicted in literature (as in Scripture itself) is not always pleasant. Valuable works sometimes have objectionable or profane elements. Good books provide four (4) recognized values.

- They build godly attitudes and character traits.
- They deepen our social and cultural awareness.
- They strengthen our use of written language.
- They provide a lifelong source of enjoyment and relaxation.

In order to instill these values in students and fulfill the stated objectives of the school, all Ember students are expected to read and study good books on a regular basis. Recognizing that materials designed for one level may not be appropriate for another, three (3) levels of criteria are applied:

- Elementary materials must contain no objectionable material,

- Objectionable elements in sixth through eighth-grade materials must be limited and must serve a specific educational purpose, and
- Objectionable content may be included in high school materials but must be outweighed by positive literary, curricular, and/or Christian values.

The curriculum department has approved required educational materials for students.

## Resubmission Policy

Students are expected to submit their best work on the first submission for every Lesson, Assignment, Quiz, and Test. However, resubmissions may be permitted in the following circumstances:

- **Lesson:** Students are automatically permitted two attempts on a lesson. Students may freely resubmit for their first two attempts without the need for teacher approval.

If a student feels that he or she deserves a resubmission on a Lesson, Assignment, Quiz, or Test due to a technical issue such as a computer malfunction, the student should message his or her teacher to make the request. With Ember, the teacher may be a physical school teacher or the student's parent/guardian. The teacher can give another attempt from his or her Canvas account. For more information on how to do this, please review the Ember orientation course.

# Schedule

**Module 1: Foundations for Functions**

- Week 1: Properties & Operations
- Week 2: Introduction to Functions
- Week 3: More Functions & Module 1 Assessment

**Module 2: Linear Functions**

- Week 4: Linear Equations & Inequalities
- Week 5: Applying Linear Functions
- Week 6: Applying More Functions & Module 2 Assessment

**Module 3: Linear Systems**

- Week 7: Linear Systems in Two Dimensions
- Week 8: Linear Systems in Three Dimensions
- Week 9: Module 3 & Quarter 1 Assessments

**Module 4: Matrices**

- Week 10: Matrix Operations
- Week 11: Using Matrices to Solve Systems & Module 4 Assessment

**Module 5: Quadratic Functions**

- Week 12: Quadratic Functions & Complex Numbers
- Week 13: Applying Quadratic Functions
- Week 14: More Quadratic Functions & Module 5 Assessment

**Module 6: Polynomial Functions**

- Week 15: Operations with Polynomials
- Week 16: Roots & Graphs of Polynomial Functions
- Week 17: More Graphs of Polynomials
- Week 18: Module 6 & Quarter 2 Assessments

**Module 7: Exponential & Logarithmic Functions**

- Week 19: Exponential Functions & Logarithms
- Week 20: Applying Exponential & Logarithmic Functions
- Week 21: More Exponential & Logarithmic Functions & Module 7 Assessment

**Module 8: Rational & Radical Functions**

- Week 22: Rational Functions
- Week 23: Radical Functions
- Week 24: More Radical Functions & Module 8 Assessment

**Module 9: Properties & Attributes of Functions**

- Week 25: Functions & Their Graphs
- Week 26: Functional Relationships
- Week 27: Module 9 & Quarter 3 Assessments

**Module 10: Conic Sections**

- Week 28: Understanding Conic Sections
- Week 29: Applying Conic Sections
- Week 30: Solving Nonlinear Systems & Module 10 Assessment

**Module 11: Probability & Statistics**

- Week 31: Probability
- Week 32: Data Analysis & Statistics
- Week 33: More Statistics & Module 11 Assessment

**Module 12: Sequences & Series**

- Week 34: Exploring Arithmetic Sequences & Series
- Week 35: Exploring Geometric Sequences & Series
- Week 36: Module 12 & Quarter 4 Assessments"